Editor: Al Bathum

Western Views

May-June, July-August, 1999

Official Publication of the West Michigan Golf Course Superintendents Association

President's Message

Summer has shot by and I can't say I have a problem with that. Hate to wish away time, but so be it. I have to admit I have been a bit remiss in my duties as the Newsletter Editor for Western Views, failing to meet the deadline for the May, June newsletter. So, sue me. Really though, recently I have had more pressing issues on my agenda. The first priority was keeping the golf course alive so I could continue to pay the mortgage and buy groceries. Small details but important all the same. It proved to be a challenge this year with the hot, humid weather, and the early start to the season. Hopefully the weather will treat us kind this fall. It was a year that I believe rivaled 95 in its brutality on turf. If you want documentation, check with the pesticide suppliers, the turf pathology lab at Michigan State and the superintendents at courses that are on full spray programs. Profits were up, recommendations were many and most superintendents are over budget on the fungicide line item. If you didn't have a disease on the golf course this summer, you probably lived in Alaska or Newberry.

Well, all is not gloom and doom. I did notice a few trees starting to show their fall colors recently. Have a great fall and we will see you at Golf Day, the Annual Meeting, or possibly the fall seminar that we are co-hosting with GCSAA.

Sincerely,
Al Bathum,
President

1999 Meeting Schedule
Western Michigan GCSA

September 13	Kent C.C. Golf Day
October 5	Walnut Hills C.C. (Annual Meeting)
November 6	*(Fall Party)

** Location and/or dates to be determined.*

Editor's Note: *Please write me if you have any corrections or if you are interested in doing an article for us at:*

Western Views
8121 Cowan Lake Drive
Rockford, Michigan 49341

Summer Meetings Held

The meetings that were held this summer were an excellent chance to meet with fellow professionals and compare notes. We had a great time with the Club Managers at Country Club of Jackson. As always, Bill Madigan and his crew had the course in great shape and Brian Funstan and his clubhouse staff made us all feel welcome. We would especially like to thank the members at Jackson for allowing us to enjoy their beautiful golf course. It was a real pleasure.

The other summer meeting was held at a new course in the Grand Rapids area. Boulder Creek hosted the July meeting and again it was in fine shape. Rick Krampe and crew have done a great job with the grow-in and the course played very nicely. I did witness an extreme problem with four putts in the group I played in. Oh, how you have to love those pure rolling Bent grass greens. Great job Rick and crew!

We really appreciate the hospitality of those that have hosted a meeting this summer. If you haven't made a meeting this year, don't miss the two remaining.

Welcome New Members

Please welcome these new members to our organization!

Joel Comstock
Student Member

Cliff Cowdin
Golf Course Superintendent,
Rolling Hills Golf Course

John Driver
Sales, Terra Distribution

Jason Farrah
Golf Course Superintendent,
Crystal Springs Country Club

Cherly France
Assistant Golf Course Superintendent,
Egypt Valley Country Club

Jeffery Knowltan
Golf Course Superintendent,
Cedar Chase Golf

Mike Leavitt
Assistant Golf Course Superintendent,
Crystal Springs Country Club

News Release

July 14, 1999

Contact: Jeff Bollig or Kristi Frey, 800-472-7878 (ext. 430/608) or media@gcsaa.org

NOTE: *What does it take to present a golf course that meets the expectations and challenges of the world's top golfers? The Pinehurst Resort golf course maintenance staff documented the labor expense necessary for such preparations. In labor costs alone, the price tag was nearly $1 million more than "normal" if the facility was to be maintained year round in a like manner. This does not include the added expense for equipment and machinery to facilitate such activities. The following analysis for Pinehurst No. 2, site of the 1999 U.S. Open Golf Championship, was provided by Pinehurst Resort Director of Golf Course Maintenance Brad Kocher, CGCS; with input from Assistant Director Bob Farren, CGCS; and Pinehurst No. 2 CGCS Paul Jett. [The title "CGCS" stand for Certified Golf Course Superintendent, which recognizes the achievement of high standards of professionalism through education and experience.]*

A Comparative Analysis: Maintenance labor hours and costs for standard course conditioning activities vs. those for the 1999 U.S. Open venue

Each year after attending the U.S. Open (or viewing it on television), the other "majors" or professional Tour events, golfers inevitably inquire: "Why can't our golf course look perfect like those?"

Well it can. All it takes is a huge staff, a large investment in machinery and a great deal more money.

The Pinehurst Resort golf course maintenance department sought to put in perspective the costs involved in preparation for the 1999 U.S. Open at Pinehurst No. 2. Included were the labor costs as well as the amount of labor hours for the week of the championship. The data were then extrapolated for the entire year assuming the same "U.S. Open" maintenance levels.

In terms of extra labor in the two years (1997-98) preceding the U.S. Open, Pinehurst incurred approximately $100,000 in additional expenses for such activities as: Hand mowing around greens; leveling sprinkler heads; additional bunker maintenance; cleaning of wooded areas; golf car path maintenance/preparation; as well as additional work on greens such as topdressing and ballmark repair. These costs do not reflect capital investment for irrigation additions, greens construction, tee additions, tee leveling or bunker renovation, which needed to be done regardless of the championship.

The most dramatic numbers involve the labor hours worked during the week of the event compared with what would be a typical mid-June expense. In a normal June period, Pinehurst staff would work 580 regular hours and 80 hours of overtime in a seven-day week. A combination of 16 to 18 full or part-time employees would comprise the staff at this time of year. For the U.S. Open, Pinehurst No. 2 had 28 regular employees and approximately 50 volunteers working 3,120 regular hours (78 employees x 40 hour work week) and two hours overtime (78 total employees x 2 hours) for a total of 156 overtime hours. Obviously, the volunteers were crucial to the cause.

These hours translate into the following:

Normal June Week (hours worked)
Full/Part-time hours: 580 regular + 80 overtime
16-18 employees: 580 regular hours + 80 overtime (at 1.5 time pay) = **700** hours of expense.

U.S. Open Week (hours worked)
Full/Part-time + Volunteers: 3,120 regular + 156 overtime
78 employees: 3,120 regular hours + 156 overtime (at 1.5 times pay) = **3,354** hours of expense.

The above computation indicates the labor necessary for U.S. Open week and equates to approximately 4.8 times the normal labor hours over a one-week period. In terms of Pinehurst's hourly *annual* payroll for Pinehurst No. 2, this intensity of maintenance would result in an *annualized increase* of $950,000 in labor. With a normal budget of approximately $750,000 on No. 2, this increase in labor would result in an annual expense of approximately $1.7 million.

Granted, not every U.S. Open

Continued, page 4

Safe Disposal

Safe Disposal of pesticides is still a very important part of the equation in golf course maintenance. With dwindling potable ground water supplies available to many around the world, safe disposal of pesticides remains a very important practice to take part in.

Recently we were able to take part in the clean sweep program here in Western Michigan. Cascade Hills Country Club over the years had retained quite a few unwanted or unusable pesticides. Many were outdated or just plain did not fit into the program legally any more. While cleaning we realized valuable storage space was being filled in our chemical storage building for storing these unusable pesticides. We contacted the people at Ottawa County Environmental Health and were able to drop the pesticides off that afternoon. It was such an easy, cost free program, I thought I would include a pamphlet in this newsletter if anyone else needed to reduce their inventory of old pesticides.

Disposal of Unwanted Pesticides: Michigan Clean Sweep

Clean Sweep if a ***free,*** *non-regulatory* program to help you safely dispose of banned and/or unwanted pesticides.

Clean Sweep is Simple and Easy

Who can use the program?

Any Michigan homeowner, farm, greenhouse, nursery, golf course or other end user of pesticides can use this service, but not dealers or persons who apply pesticides for hire.

What can I bring and how much?

Old, unwanted, out-of-date or unusable pesticides can be dropped off for safe disposal. Bring whatever you have.

What's the catch?

There is no catch. Clean Sweep is a good deal for you. There is no red tape and all information is kept strictly confidential. **And best of all... Clean Sweep is FREE!**

Tips for safe transport of agricultural chemical:

•Keep pesticides in their original and labeled containers.

• Do not mix contents of unknown/unlabeled containers.

• Make sure that containers are not leaking prior to bringing them to a collection facility.

• Inspect steel containers for rust, pinholes, or deficient seams.

• Over pack any leaking containers in a clear plastic bag or leak proof container.

• Do not transport containers with open tops.

• Place chemicals in vehicle away from passengers.

• Secure all containers so they cannot slide, tip or spill contents.

For more information, contact:
Ottawa County Environmental Health
Hazardous Waste Management Program
12251 James Street, Suite 200
Holland, MI 49424 616/393-5638

A Comparative Analysis, *continued from page 2*

venue has been the beneficiary of so many volunteers giving their time and energy to prepare the course to this intensity. It is a luxury to have 78 workers, and Pinehurst is an appreciative benefactor. If the number were only 50 staff, which might be more "normal" for an Open, the net result over a year would be an annualized expense of three times the normal labor hours. This would result in an annualized increase of approximately $500,000 in labor and an annualized budget of $1.25 million. Below are some of the tasks performed and the hours associated with normal maintenance levels as well as U.S. Open levels follow:

U.S. Open Course Preparation

	Normal Day (staff x hours)		Normal Week		US Open Day (staff x hours)		US Open Week	
Greens (mowing)	5 X 2.5 hours =	12.50	X 7 =	87.50	8 X 1.5 hours twice/day =	24.00	X 7 =	168.00
Setup	1 X 4 hours =	4.00	X 7 =	28.00	2 X 4 hours =	8.00	X 7 =	56.00
Fairways (mowing)	2 X 2.5 hours =	5.00	X 4 =	20.00	5 X 1.5 hours twice/day =	15.00	X 10 =	105.00
Tees/Short cut (mowing)	3 X 4 hours =	12.00	X 5 =	60.00	10 X 2.5 hours =	25.00	X 7 =	175.00
Rough (mowing)	2 X 12 hours =	24.00	X 2 =	48.00	4 X 6 hours =	24.00	X 7 =	168.00
Intermediate rough (mowing)	1 X 3 hours =	3.00	X 3 =	9.00	1 X 3 =	3.00	X 7 =	21.00
Bunker raking	2 X 3 hours =	6.00	X 7 =	42.00	10 X 4 hours =	40.00	X 7 =	280.00
Divot repair				30.00				169.00
Stimpmeter reading	1 X .25 =	0.25		0.25	4 X 6 hours =	24.00	X 7 =	168.00
Backpack blowers (pine needles off bunkers/turf)				2.00				168.00
Clipping removal (Poling)				7.00				252.00
Rake sand cart paths	1 X 8 hours =	8.00		8.00	3 X 3 hours =	9.00	X 7 =	63.00
Rake natural sand areas	1 X 4 hours =	4.00		4.00	5 X 3 hours =	15.00	X 7 =	105.00
Collect fairway clipping				N/A	1 X 6 hours =	6.00	X 7 =	42.00

The goal of course preparation for professional events is to have the golf course -- the field of play -- set up to test the skills of the participants. Consistent, daily preparation of the golf course form height of fairway cut, green speed, repaired divots, and hand raked bunkers ensures that each player encounters the same conditions as their competitors each day of the event. Those same conditions can be attained at one's home course, but it comes as a steep price.

Communication Can Improve the Pro/Superintendent Relationship

Lance Halder, Director of Golf,
Cateechee Golf Club
Through The Green, July/August 1999

In today's business world, there is no argument that great communication is the key to running a successful operation. In no other industry is this more applicable than the golf business. Communication is important among all channels within a golf facility; however, none is more important than interaction between the golf professional and the superintendent. There are many ways in which this communication can be firmly established to ensure the transferral of vital information between these two persons.

One of the most important keys in the communication process is the use of today's technological advances to maximize interaction. Professionals and superintendents alike can use e-mail and the Internet to communicate in many situations. The pro shop staff and the superintendent may also wish to have their two-way radios attached to the same central station. This will allow for free communication between these two areas of management. The use of pagers and cellular communications are also becoming widely popular ways of communication in today's golf industry.

For these methods of communication to work, both the professional staff and the superintendent must make a commitment to work together as much as possible. This can be accomplished simply by scheduling weekly meetings attended by all management from both sides of the golf course. This gives each staff member a chance to be informed of any future events, scheduling or information that may be important factors in other decision making. During these meetings superintendents and professionals can schedule events together to maximize conditions and number of rounds sold at key times during the year. For example, tournaments, holidays, and corporate outings should always be held when heavy course maintenance is not scheduled. These meetings will insure that the superintendent is aware of all important dates within the pro shop, and golf scheduling can also be worked around crucial golf course projects.

There are only a few of the ways that information can be transferred among golf course superintendents and professionals. For any of these methods to work, however, both sides must be willing to share crucial information on a regular basis. The toughest part of thorough communication is not identifying methods of communication, but putting forth the time and effort to include another staff in your decision making. This may take a little time, trouble and education, but the results are definitely worth the effort.

* * * * *

Understanding Water Quality

Steve Ninemire,
President, The 9Mire Group
Through The Green, July/August 1999

What is water quality and how is it classified? Water is usually evaluated and classified based on its intended application and its mineral and biological components. Numerous sources classify plants with respect to their tolerance of, or sensitivity to, salinity and mineral toxicity. Unfortunately, the superintendent does not have a choice in the quality of water available for his course. In addition, the superintendent is often times forced to accept water that may not be fit for other domestic uses. The growing trend in mandating the use of recycled water on golf courses is further reducing the choices of water quality.

Why Water Quality is Important

The quality of irrigation water affects soil water chemistry. As water moves through the soil and flows across the land, it picks up salts and sediment. Most of the problems encountered with irrigation water are associated with the direct and indirect effects of excess total salts (TDS), excesses of specific minerals ions and excesses of bicarbonate and associated elevated (alkaline) pH. High soil salt content compounds this problem. The nutrients available to the plants, as well as the quality and quantity of water, is affected by the dissolved solids in the water.

Plants only need a small amount of nutrients, which they can obtain from dissolved solids in water. Almost all water used by plants evaporates into the atmosphere. Nutrients are transported from the soil as the evaporated water cools the plant. Thus, if a given soil is irrigated with a given water quality, over an extended period the soil will assume the characteristics of that irrigation source.

Start With the Right Test

In our quest to understand water quality, it is imperative to know the condition of the soil and the mineral makeup of the irrigation source. The first step should be an irrigation suitability test. There are over 25 different types of "water analysis" available from analytical labs. We are only interested in testing for the elements that will affect or influence our turf quality. A good irrigation suitability test should include the following minimum test standards: pH, conductivity, calcium, magnesium, potassium, sodium, iron, alkalinity, carbonate, bicarbonate, hydroxide, chloride, sulfur, boron, and total salt concentration. For effluent water nutrients, also request analysis for phosphorus (P), total Kjeldahl Nitrogen (TKN), ammonia-nitrogen and nitrate-nitrogen. Finally, formulas and ratios needed to determine water quality include Sodium Absorption Ratio (SAR), pHc, adjusted SAR, total cations and anions.

In order to collect enough water for irrigation purposes, it is not uncommon for golf courses to use several sources of water, including well, city, surface drainage, river and effluent. It is very important to sample each source individually. You should also take one composite sample directly from the irrigation head after it has run at least 10 minutes to flush all stagnant water from the line. This will ensure that a representative sample of the water that is irrigating your turf is tested. It is also important to sample throughout the year to check for variations, as some results will vary significantly because of seasonal demands made upon the water table.

The lab will need at least 16 oz. of water to run an irrigation suitability test. Collect the sample in a clean plastic bottle (an empty drinking water bottle works great) rinsed several times with the water to be tested. Make sure you label each sample clearly with a description of the source.

Interpreting the Data

A great deal of confusion in interpreting the results of the lab comes from the many different units of measure for the report results. Generally, you will find the results listed as parts per million (ppm), milligrams per liter (mg/L), or millequivalents per liter (meq/L). To change from ppm to meq/L, check the table for the element in question, then use the following formulas:

equiv. weight x meq/L = ppm (or mg/L)
ppm (or mg/L) , equiv. weight = meq/L

Equivalent Weights

Cations (+ charged)

Ca (calcium)	20.0
Mg (magnesium)	12.2
Na (sodium)	23.0
Ca + Mg (assume 90% is Ca)	19.2
K (potassium)	39.0

Anions (- charged)

Cl (chloride)	35.5
NO_3 (nitrate)	62.0
SO_4 (sulfate)	48.0
CO_3 (carbonate)	30.0
HCO_3 (bicarbonate)	61.0

After you receive the results of your water tests back from the lab, you will need to prioritize the data into what will affect you most. The components of water quality can be broken down into five main areas.

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Water Quality, *continued from page 5*

Salinity

The salts or total solids (TDS) in the irrigation or soil water determine the salinity. Salinity is stated as TDS in mg/L or ppm. It is often determined by measuring the electrical conductivity (EC) of the water and reported in millimhos per centimeter (mimhos/cm), micromhob per centimeter (mhos/cm), or decisiemens per meter (sD/m). TDS in ppm is approximately equal to the EC (mmhos/cm) multiplied by 640. Problems may occur when evaluating high areas with a high soil salinity and a saline irrigation source. These problems are usually not uniform across the site but will occur sporadically. The superintendent will usually encounter salinity problems during periods of heat or drought stress. On established turf, one of the first visual signs of salinity is a blue-green or purple-colored turf similar to the color of drought-stricken grasses. High demand by the turfgrass, combined with reduced water availability resulting from higher salts in solution, causes these drought-like conditions. The situation is further magnified as it is very hard to leach excess salts from soil during periods of high temperatures and limited rainfall. Another sign of high soil salinity can be reduced or delayed seed germination and seedling development. As sodium builds on the soil colloid, calcium and magnesium levels will be reduced and the soil will lose its desirable structure. Excess sodium causes clay to become like a fine powder as the particles swell and disperse, which decreases water and air movement in the soil.

Sodium

Sodium ion content of an irrigation source can cause several related problems. As the proportion of sodium attached to the clay in the soil increases, the soil tends to "run together", causing reduced rates of water penetration. The sodium absorption ratio (SAR) is a measured index that indicates the relative activity of sodium ions as they react with clay. This should be compared to your particular plant type to give you an indication of the plant's ability to overcome high sodium concentrations in the water. The refined version, called the Adjusted SAR or SARadj, takes into account the limited solubility of other cations in high salt- or bicarbonate-containing waters. Remember: it is the *ratio* that is important, not necessarily the amounts of the soluble cations. Very low salt (low EC) waters can have high SAR values and represent serious hazards to water infiltration and soil permeability if other cations, especially calcium, are low or absent, or if the water contains bicarbonate.

Bicarbonates and pH

The bicarbonate/pH component is less straightforward and more indirect in effect, but the severity of the problems created can overshadow other factors previously mentioned. The presence of excessive bicarbonate in irrigation water is one of the most significant causes of soil structure and plant nutrition problems. The negative effects of the application of excessive bicarbonate are usually associated with soil sealing, which leads to the build up of both excessive salts and toxic ion constituents. Bicarbonate ions in the soil solution will precipitate calcium as the soil approaches dryness. This removes calcium and, to a lesser extent, magnesium from the clay and leaves sodium in its place. By repeating this process over time, a calcium-dominant soil can become a sodium-dominate soil. As the available calcium is lost, poor air movement and gas exchange through the soil diminish the soil structure. The end effect of high bicarbonate water is the ultimate loss and control of water penetration.

The second negative factor associated with bicarbonates is that it is a direct cause of soil alkalinity. Soluble sodium in the presence of lime or bicarbonates causes the hydrolysis of lime into soluble carbonate and additional bicarbonates and adds hydroxyl ion to the soil solution. This can raise the pH of the soil from neutral, up to +10. The increase in pH reduces the availability of many nutrients including ion, zinc, manganese, copper, calcium, magnesium and phosphate, resulting in further deficiencies and nutrient imbalances.

Toxic Ion Constituents

Toxic ions such as chloride, boron, sodium or other metals are usually present where excessive salts are encountered. Waters high in bicarbonates have been shown to induce iron deficiencies in some plants, but this is minor when compared to their role in creating permeability problems. Sodium, chloride, and boron produce distinct symptoms of chlorosis (yellowing), necrosis (dead tissue), and root burn or tip die back. The symptoms induced are often more obvious and alarming than the reduction in growth and general unthriftiness induced by osmotic drought alone.

Conclusion

In dealing successfully with irrigation water quality it is essential to (1) always use good irrigation suitability and soil tests to make well-informed decisions, (2) compare your test results with the standards, (3) adjust your water and amendment practices as necessary and (4) monitor soil and water changes throughout the year. By removing many of the "unknown" elements from the overall equation, it will be possible to present the best product with the least amount of input cost.

* * * * *

Golf Course Superintendents Association of America Education Seminars • July, 1999 - May, 2000

Date	Seminar Title	Location
07/22/1999	Protecting Natural Resources on the Golf Course	Hollywood, FL
08/23/1999	Maximizing Job Satisfaction	Palos Verdes, CA
09/09/1999*	Maximizing Job Satisfaction	Phoenix, AZ
09/10/1999	Advanced Weed Management	Kauai, HI
09/21/1999	Human Resource Management	Orlando, FL
10/04/1999	Protecting Natural Resources on the Golf Course	Syracuse, NY
10/07/1999*	Bentgrass Management and Rootzone Maintenance	Billings, MT
10/13/1999	Bentgrass Management and Rootzone Maintenance	Hauppauge, NY
10/13/1999*	Sustainable Golf Course Landscape Design: Enhancing Aesthetics, Function and	Jackson Hole, WY
10/18/1999	Advanced Weed Management	Little Rock, AR
10/19/1999	Lake and Aquatic Plant Management	Little Rock, AR
10/19/1999	Protecting Natural Resources on the Golf Course	Grand Rapids, MI
10/25/1999*	Wildlife Management and Habitat Conservation	Manchester, NH
10/26-27/1999	Physical Problems of Turfgrass Soils: Identification and Correction	Brewster, MA
10/26/1999	Bentgrass Management and Rootzone Maintenance	Rockford, IL
10/26/1999	Management Strategies for the Turfgrass System	Lexington, KY
10/27/1999	Bentgrass Summer Stress Management for Cool/Humid Regions	West Orange, NJ
11/01/1999	Maximizing Turfgrass Disease Control	San Marcos, CA
11/04/1999	Employee Safety Training	Providence, RI
11/04/1999	Integrated Disease Management for Bermudagrass Golf Courses	Jacksonville, FL
11/05/1999	The Microbiology of Turfgrass Soils	Providence, RI
11/08/1999	Lake and Aquatic Plant Management	South Center, WA
11/8-9/1999	The Assistant Superintendent: Managing People and Jobs	Arvada, CO
11/9-10/1999*	Managerial Productivity	Andover, KS
11/09/1999	Employee Safety Training	Novi, MI
11/10/1999	Turfgrass Ecology	St. Louis, MO
11/15-16/1999	Golf Greens: History, Theory, Construction and Maintenance	Myrtle Beach, SC
11/15/1999	Bentgrass Management and Rootzone Maintenance	Robinsonville, MS
11/16/1999	Human Resource Management	Bolton, MA
11/16/1999	Financial Essentials for the Superintendent	Myrtle Beach, SC
11/16/1999*	Wildlife Management and Habitat Conservation	Coeur d' Alene, ID
11/16/1999	Turfgrass Stress Management	Ames, IA
11/17/1999	Budgeting and Forecasting	Bolton, Ma
11/17/1999	Maximizing Job Satisfaction	Tarrytown, NY
11/18/1999	Sustainable Golf Course Landscape Design: Enhancing Aesthetics, Function and	Hudson, OH
11/18/1999	Human Resource Management	White Haven, PA
11/18/1999	Bentgrass Summer Stress Management for Cool/Humid Regions	Centerville, OH
12/01/1999	Golf Course Construction Management and Grow-In	Dallas, TX
12/01/1999	Bentgrass Summer Stress Management for Cool/Humid Regions	Berlin, CT
12/02/1999	Bentgrass Management and Rootzone Maintenance	Dallas, TX
12/02/1999	Problems and Solutions: Using Annuals and Perennials in the Golfscape	Berlin, CT
12/06/1999	Management Strategies for the Turfgrass System	Albuquerque, NM
12/06/1999	Drainage Systems	Hammond, LA
12/06/1999	Maximizing Job Satisfaction	Atlantic City, NJ
12/07/1999	Sustainable Golf Course Landscape Design: Enhancing Aesthetics, Function and	Brookfield, WI
12/08/1999	Bentgrass Management and Rootzone Maintenance	Brookfield, WI
12/08/1999*	Drainage Systems	Lincoln, NE
12/08/1999	Enhancing Your Value as a Professional Golf Course Superintendent	Salt Lake City, UT
12/13-14/1999	Spanish for Golf Course Management I	Franklin, TN
12/14/1999	Bentgrass Summer Stress Management for Cool/Humid Regions	Baltimore, MD
12/15/1999	Personal Stress Management	Baltimore, MD
12/16/1999*	Bentgrass Management and Rootzone Maintenance	Oklahoma City, OK
01/05/2000	Sustainable Golf Course Landscape Design: Enhancing Aesthetics, Function and	Pleasanton, CA
01/06/2000	Lake and Aquatic Plant Management	Pleasanton, CA
01/06/2000	The Microbiology of Turfgrass Soils	St. Louis, MO
01/10/2000	Bentgrass Management and Rootzone Maintenance	Charlotte, NC
01/10/2000	Human Resource Management	Portland, OR
1/10-11/2000*	Physical Problems of Turfgrass Soils: Identification and Correction	Atlanta, GA

*Indicates seminars without a GCSAA provided lunch

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Golf Course Superintendents Association of America Education Seminars, *continued from page 7*

Date	Seminar Title	Location
01/10/2000	Protecting Natural Resources on the Golf Course	Fishkill, NY
01/11/2000	Golf Course Safety, Security and Risk Management	Powell, OH
01/11/2000	Turfgrass Ecology	Mars, PA
1/13-14/2000	Physical Problems of Turfgrass Soils: Identification and Correction	Oakbrook, IL
01/17/2000	Protecting Natural Resources on the Golf Course	Indianapolis, IN
01/18/2000	Evaluating Your Golf Course Irrigation System	Rockport, ME
01/19/2000	Bentgrass Management and Rootzone Maintenance	Kansas City, MO
01/24/2000	Enhancing Your Value as a Professional Golf Course Superintendent	Sacramento, CA
01/25/2000	Lake and Aquatic Plant Management	Richmond, VA
02/22/2000	Bentgrass Management and Rootzone Maintenance	Albany, NY
2/24-25/2000	Golf Greens: History, Theory, Construction and Maintenance	Bloomington, IL
03/02/2000	The Superintendent as Grow-In Manager	Birmingham, AL
03/06/2000*	Turfgrass Ecology	Sioux Falls, SD
03/06/2000	Managing Turfgrass Root Systems	Providence, RI
03/06/2000	Management of Localized Dry Spots and Water Repellent Soils	Providence, RI
03/07/2000	Maximizing Job Satisfaction	Gaylord, MI
3/7-8/2000	Physical Problems of Turfgrass Soils: Identification and Correction	Valley Forge, PA
3/7-8/2000	Golf Greens: History, Theory, Construction and Maintenance	St. Louis Park, MN
03/08/2000	Maximizing Teamwork	Gaylord, MI
03/14/2000	Management Strategies for the Turfgrass System	Cincinnati, OH
03/14/2000	Turfgrass Stress Management	Sunnehanna, PA
03/15/2000	Bentgrass Management and Rootzone Maintenance	Manchester, VT
03/16/2000*	Lake and Aquatic Plant Management	Phoenix, AZ
03/16/2000	Insect and Disease Management for Warm Season Turfgrass	Palm Desert, CA
04/04/2000	Golf Course Safety, Security and Risk Management	Dallas, TX
05/04/2000	Human Resource Management	Sacramento, CA

*Indicates seminars without a GCSAA provided lunch

WESTERN VIEWS
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